

What is claimed is:

1. A method for the removal of mercury of carbonaceous fuel comprising
  - a) introducing any carbonaceous fuel; coal, coke, bio-mass or combinations thereof containing mercury into a first stage partial oxidation (gasifier) unit operating at a stoichiometric air or oxygen air to fuel ratio of 0.40 to 0.80, to provide a reducing operating condition for high levels of mercury capture in an alkaline molten fuel ash slag under reducing conditions with carbon, carbon monoxide and hydrogen as the reducing agents for a partial oxidation (gasifier) temperature range of 2200°F to 3000°F;
  - b) introducing an alkali or any alkali or combinations thereof from the class consisting of lime, limestone, dolomite, calcium chloride, nacholite, and trona, with the said fuel or via a separate stream into the first stage oxidation unit, the alkali acting as a flux to reduce molten carbonaceous fuel ash viscosity and to react with the mercury species being liberated from said fuel;
  - c) fuel gas and molten slag being separated in a first stage cyclonic device following the fuel gas-slag mix section and said molten slag containing combinations of alkalis and mercury compounds being removed to a water quench system and disposed of.
2. An apparatus for removing mercury during combustion of a carbonaceous fuel as shown in Figure 1, and operated according to the parameters shown in Figure 2.